

Force Balance Commentary 2022 Crash Test Force Balance Results

For 2022 SCARS had 3 crash tests. In Crash Tests 1 & 2 the bullet vehicle experienced 2 impacts (with resulting crush) as part of the test. There were also secondary impacts by the target vehicle into the side of the bullet vehicle in both tests due to the spin induced in the target by the offset hit. These secondary impacts have not been analyzed.

In Crash Test 1 the bullet vehicle impacted the target, and then continued on to hit the concrete rails stacked behind the impact point.

In Crash Test 2 the bullet vehicle impacted the target, and then continued on to hit the side of the bullet vehicle from test 1 driving it on to hit the concrete rails stacked beyond the impact point.

In Crash Test 3 neither the bullet vehicle nor the target vehicle had any secondary impacts.

Obviously, Crash Test 3 is ideal for a Speed from Crush analysis since there is no crushing of the vehicles other than in the crash itself.

Crash Tests 1 & 2 are less ideal since they had crush energy losses at two points within the test, with no way to separate how much crush was done in the first impact between the bullet and target, and how much crush was due to the secondary impact between the concrete (in test 1) or the buffer vehicle (in test 2).

Due to a limited number of Crash Tests in the NHTSA database for the Similar Vehicle year range for the Ford Police Interceptor (Taurus) and the Mazda 626, "CLASS" vehicles based on the Make and Model were developed to establish the A-B Stiffness MIN-AVG-MAX and Standard Deviation used within the Force Balance model.

CRASH TEST 1

The setup for Test 1 is that the Charger began to pull out into the intersection and then stopped. The driver of the Police Interceptor stated that he was doing “around 50 mph”. After the collision occurred, the Police Interceptor continued on and impacted a concrete wall on the opposite side of the “T” intersection.

In Crash Test 1 a 2 point profile was used for the crush damage to the front of the crash damage to the Ford Police Interceptor bullet vehicle, and a 3 point profile was used for the damage to the side of the Dodge Charger around the front wheel well.

For the first run through I like to set the Lever Arm on both vehicles to 0 and set the Angle to the Collision Surface to 0 for both vehicles. The result of this on the speed calculations is that the closing speeds calculated will be at a minimum for each set of A-B stiffness values.

Using this setup, the closing (in this case, impact) speed of the Police Interceptor based on average stiffness values for the Police Interceptor (Taurus) is 49.3 mph. The likely range of the closing speed is within +/- one Standard Deviation of the average which is 38.4-58.2 mph.

Since the impact was over the front axle of the Charger, the effect of the lever arm of ~56 inches was also analyzed. When the lever arm was added, the closing speed of the Police Interceptor based on the average stiffness values increases to 60.1 mph with a likely range of 46.8-71.0 mph. It can be seen that adding the lever arm increases the calculated closing speed in this test by about 11 mph for the average stiffness values.

Recall that the bullet vehicle had two significant impacts to its front end in this test, the result of this is that there is more crush to the Police Interceptor than can be attributed to the impact between the Police Interceptor and the Charger. This will result in a higher than actual speed calculated for the Police Interceptor for the impact between the Police Interceptor and the Charger.

The Force Balance model results for this test printed “two up” follow this explanation. The CLASS Stiffness Test Summary and 2 pages for each of the Force Balance results printed one per page follow at the end of these explanations.

Available Test Results
Front Impact Test Summary
Report Filter Settings

Year Range: 2000 - 2021
 Make: FORD
 Model: TAURUS

Test Number	Vehicle Info	No		KEES	Vehicle Width				Crush Factor
		Damage Average Speed (mph)	Crush (inch)		Stiffness		Values		
					A	B	G	Kv	
5143	2004 FORD TAURUS FOUR DOOR SEDAN	5.0	20.9	34.7	297.6	84.6	523.1	115.5	23.1
4150	2001 FORD TAURUS FOUR DOOR SEDAN	5.0	19.3	34.7	326.1	100.5	529.3	137.2	25.0
4174	2001 FORD TAURUS FOUR DOOR SEDAN	5.0	15.1	29.5	341.7	110.4	529.0	160.1	22.9
4134	2000 FORD TAURUS FOUR DOOR SEDAN	5.0	14.9	29.7	352.2	116.5	532.3	168.5	23.6
4135	2000 FORD TAURUS FOUR DOOR SEDAN	5.0	14.9	29.6	352.3	116.8	531.4	169.0	23.6
3248	2000 FORD TAURUS FOUR DOOR SEDAN	5.0	17.8	35.2	363.8	123.2	537.1	167.4	27.8
4776	2004 FORD TAURUS FOUR DOOR SEDAN	5.0	17.8	35.1	364.4	123.1	539.6	167.3	27.6
3225	2000 FORD TAURUS FOUR DOOR SEDAN	5.0	12.0	27.3	375.3	140.2	502.5	209.9	25.0
4987	2004 FORD TAURUS FOUR DOOR SEDAN	5.0	10.6	24.7	379.3	141.6	508.0	222.4	23.1
6808	2010 FORD TAURUS FOUR DOOR SEDAN	5.0	19.4	35.1	381.8	118.7	614.1	161.4	25.5
7302	2010 FORD TAURUS FOUR DOOR SEDAN	5.0	12.1	24.7	384.5	125.4	589.5	197.0	20.2
7271	2010 FORD TAURUS FOUR DOOR SEDAN	5.0	11.9	24.7	392.5	130.5	590.3	205.0	20.6
6964	2011 FORD TAURUS FOUR DOOR SEDAN	5.0	17.9	35.1	408.3	137.1	608.0	186.4	27.5
3224	2000 FORD TAURUS FOUR DOOR SEDAN	5.0	12.1	30.0	412.6	170.2	500.2	245.0	29.7
3150	2000 FORD TAURUS FOUR DOOR SEDAN	5.0	12.1	29.9	428.2	175.7	521.7	253.4	29.5
6967	2011 FORD TAURUS FOUR DOOR SEDAN	5.0	7.5	19.9	443.5	176.9	556.1	315.7	21.2
7872	2013 FORD TAURUS FOUR DOOR SEDAN	5.0	15.4	34.8	474.2	183.1	614.0	249.8	31.4
Average (AVG)					381.1	133.8	548.6	195.9	25.1
Minimum (MIN)					297.6	84.6	500.2	115.5	20.2
Maximum (MAX)					474.2	183.1	614.1	315.7	31.4
Standard Deviation (STDev-sample)					43.7	28.2	39.2	49.7	3.3
Number of Tests (n)					17				

Crash Test 1 - No Lever Arm

2013 FORD TAURUS AWD - Front Impact

Curb Weight (pounds):

Occupant + Cargo Weight (pounds):

Total Weight (pounds):

Angle Coll Force to Normal (degrees):

No Damage Speed (mph):

Energy Crush Depth (inches):

Damage Length (inches):

Crush Profile Measurements:

PDOF

Lever Arm Distance (inches):

Yaw Moment of Inertia (lb-ft-sec²):

"Known" Stiffness Values

	A	B
Average	<input type="text" value="348.4"/>	<input type="text" value="116.2"/>
Minimum	<input type="text" value="181.2"/>	<input type="text" value="29.5"/>
Maximum	<input type="text" value="593.3"/>	<input type="text" value="286.6"/>
Std. Deviation	<input type="text" value="78.9"/>	<input type="text" value="53.6"/>

	Equal		Zone	Area	Zone	Area
	Spacing	Zone Area	Depth(x)	Depth(x)	Depth(y)	Depth(y)
	(inches)	(inches ²)	(inches)	(inches ³)	(inches)	(inches ³)
C1 (inches)	<input type="text" value="7.00"/>	<input type="text" value="65.00"/>	<input type="text" value="8.21"/>	<input type="text" value="8005.83"/>	<input type="text" value="38.28"/>	<input type="text" value="37320.83"/>
C2 (inches)	<input type="text" value="23.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C3 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C4 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	Average		KE	Closing			
	Force	Damage	Speed	Delta V	Speed		
	A	B	(poundsf)	Energy (ft*lbs)	(mph)	(mph)	(MPH)
Minimum	<input type="text" value="181.2"/>	<input type="text" value="29.5"/>	<input type="text" value="20270.25"/>	<input type="text" value="37417.88"/>	<input type="text" value="16.2"/>	<input type="text" value="13.7"/>	<input type="text" value="28.6"/>
Avg - 2 Std. Deviations	<input type="text" value="190.6"/>	<input type="text" value="9.0"/>	<input type="text" value="10582.00"/>	<input type="text" value="32422.77"/>	<input type="text" value="15.0"/>	<input type="text" value="11.9"/>	<input type="text" value="24.9"/>
Avg - 1 Std. Deviations	<input type="text" value="269.5"/>	<input type="text" value="62.6"/>	<input type="text" value="39276.25"/>	<input type="text" value="66802.92"/>	<input type="text" value="21.6"/>	<input type="text" value="18.4"/>	<input type="text" value="38.4"/>
Average	<input type="text" value="348.4"/>	<input type="text" value="116.2"/>	<input type="text" value="67970.50"/>	<input type="text" value="108659.78"/>	<input type="text" value="27.5"/>	<input type="text" value="23.6"/>	<input type="text" value="49.3"/>
Avg + 1 Std. Deviations	<input type="text" value="427.3"/>	<input type="text" value="169.8"/>	<input type="text" value="96664.75"/>	<input type="text" value="150912.93"/>	<input type="text" value="32.5"/>	<input type="text" value="27.9"/>	<input type="text" value="58.2"/>
Avg + 2 Std. Deviations	<input type="text" value="506.2"/>	<input type="text" value="223.4"/>	<input type="text" value="125359.00"/>	<input type="text" value="193277.12"/>	<input type="text" value="36.7"/>	<input type="text" value="31.6"/>	<input type="text" value="65.9"/>
Maximum	<input type="text" value="593.3"/>	<input type="text" value="286.6"/>	<input type="text" value="158999.75"/>	<input type="text" value="242738.01"/>	<input type="text" value="41.2"/>	<input type="text" value="35.4"/>	<input type="text" value="73.9"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="8.21"/>		k^2		<input type="text" value="3474.23"/>		
Damage Centroid Depth (y) (inches)	<input type="text" value="38.28"/>		Eff. Mass Ratio (gamma)		<input type="text" value="1.00"/>		
Area of Damage (inches ²):	<input type="text" value="975.00"/>						

2015 DODGE CHARGER - Side Impact

Curb Weight (pounds):

Occupant + Cargo Weight (pounds):

Total Weight (pounds):

Angle Coll Force to Normal (degrees):

No Damage Speed (mph):

Energy Crush Depth (inches):

Damage Length (inches):

Crush Profile Measurements:

PDOF

Lever Arm Distance (inches):

Yaw Moment of Inertia (lb-ft-sec²):

	Unequal		Zone	Area	Zone	Area
	Spacing	Zone Area	Depth(x)	Depth(x)	Depth(y)	Depth(y)
	(inches)	(inches ²)	(inches)	(inches ³)	(inches)	(inches ³)
C1 (inches)	<input type="text" value="0.00"/>	<input type="text" value="47.00"/>	<input type="text" value="305.50"/>	<input type="text" value="4.33"/>	<input type="text" value="1323.83"/>	<input type="text" value="31.33"/>
C2 (inches)	<input type="text" value="13.00"/>	<input type="text" value="37.00"/>	<input type="text" value="370.00"/>	<input type="text" value="5.15"/>	<input type="text" value="1905.50"/>	<input type="text" value="53.65"/>
C3 (inches)	<input type="text" value="7.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C4 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	Average		KE	Delta V		
	Force	Damage	Speed	mph	bsub1	
	A	B	(poundsf)	Energy (ft*lbs)	(mph)	(mph)
Minimum	<input type="text" value="86.3"/>	<input type="text" value="49.3"/>	<input type="text" value="20270.25"/>	<input type="text" value="18647.28"/>	<input type="text" value="11.9"/>	<input type="text" value="14.9"/>
Avg - 2 Std. Deviations	<input type="text" value="60.0"/>	<input type="text" value="23.9"/>	<input type="text" value="10582.00"/>	<input type="text" value="10329.33"/>	<input type="text" value="8.9"/>	<input type="text" value="13.0"/>
Avg - 1 Std. Deviations	<input type="text" value="123.4"/>	<input type="text" value="101.0"/>	<input type="text" value="39276.25"/>	<input type="text" value="34639.16"/>	<input type="text" value="16.2"/>	<input type="text" value="20.0"/>
Average	<input type="text" value="165.2"/>	<input type="text" value="180.7"/>	<input type="text" value="67970.50"/>	<input type="text" value="58454.05"/>	<input type="text" value="21.1"/>	<input type="text" value="25.7"/>
Avg + 1 Std. Deviations	<input type="text" value="198.7"/>	<input type="text" value="261.5"/>	<input type="text" value="96664.75"/>	<input type="text" value="82081.74"/>	<input type="text" value="25.0"/>	<input type="text" value="30.3"/>
Avg + 2 Std. Deviations	<input type="text" value="227.5"/>	<input type="text" value="342.9"/>	<input type="text" value="125359.00"/>	<input type="text" value="105602.27"/>	<input type="text" value="28.3"/>	<input type="text" value="34.4"/>
Maximum	<input type="text" value="257.4"/>	<input type="text" value="438.8"/>	<input type="text" value="158999.75"/>	<input type="text" value="133087.59"/>	<input type="text" value="31.8"/>	<input type="text" value="38.5"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="4.78"/>		k^2		<input type="text" value="3360.21"/>	
Damage Centroid Depth (y) (inches)	<input type="text" value="43.56"/>		Eff. Mass Ratio (gamma)		<input type="text" value="1.00"/>	
Area of Damage (inches ²):	<input type="text" value="675.36"/>					

Crash Test 1 - with Lever Arm

2013 FORD TAURUS AWD - Front Impact

Curb Weight (pounds):

Occupant + Cargo Weight (pounds):

Total Weight (pounds):

Angle Coll Force to Normal (degrees):

No Damage Speed (mph):

Energy Crush Depth (inches):

Damage Length (inches):

Crush Profile Measurements:

PDOF

Lever Arm Distance (inches):

Yaw Moment of Inertia (lb-ft-sec²):

"Known" Stiffness Values

	A	B
Average	<input type="text" value="348.4"/>	<input type="text" value="116.2"/>
Minimum	<input type="text" value="181.2"/>	<input type="text" value="29.5"/>
Maximum	<input type="text" value="593.3"/>	<input type="text" value="286.6"/>
Std. Deviation	<input type="text" value="78.9"/>	<input type="text" value="53.6"/>

	Equal Spacing		Zone		Area	
	Spacing (inches)	Zone Area (inches ²)	Depth(x) (inches)	Depth(y) (inches)	Depth(x) (inches ³)	Depth(y) (inches ³)
C1 (inches)	<input type="text" value="7.00"/>	<input type="text" value="65.00"/>	<input type="text" value="8.21"/>	<input type="text" value="38.28"/>	<input type="text" value="8005.83"/>	<input type="text" value="37320.83"/>
C2 (inches)	<input type="text" value="23.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C3 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C4 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	Average Force		Damage Energy (ft*lbs)	KE		Closing Speed (MPH)
	A	B		Speed (mph)	Delta V (mph)	
Minimum	<input type="text" value="181.2"/>	<input type="text" value="29.5"/>	<input type="text" value="20270.25"/>	<input type="text" value="16.2"/>	<input type="text" value="11.2"/>	<input type="text" value="34.8"/>
Avg - 2 Std. Deviations	<input type="text" value="190.6"/>	<input type="text" value="9.0"/>	<input type="text" value="10582.00"/>	<input type="text" value="15.0"/>	<input type="text" value="9.8"/>	<input type="text" value="30.4"/>
Avg - 1 Std. Deviations	<input type="text" value="269.5"/>	<input type="text" value="62.6"/>	<input type="text" value="39276.25"/>	<input type="text" value="21.6"/>	<input type="text" value="15.1"/>	<input type="text" value="46.8"/>
Average	<input type="text" value="348.4"/>	<input type="text" value="116.2"/>	<input type="text" value="67970.50"/>	<input type="text" value="27.5"/>	<input type="text" value="19.4"/>	<input type="text" value="60.1"/>
Avg + 1 Std. Deviations	<input type="text" value="427.3"/>	<input type="text" value="169.8"/>	<input type="text" value="96664.75"/>	<input type="text" value="32.5"/>	<input type="text" value="22.9"/>	<input type="text" value="71.0"/>
Avg + 2 Std. Deviations	<input type="text" value="506.2"/>	<input type="text" value="223.4"/>	<input type="text" value="125359.00"/>	<input type="text" value="36.7"/>	<input type="text" value="25.9"/>	<input type="text" value="80.4"/>
Maximum	<input type="text" value="593.3"/>	<input type="text" value="286.6"/>	<input type="text" value="158999.75"/>	<input type="text" value="41.2"/>	<input type="text" value="29.1"/>	<input type="text" value="90.1"/>

Damage Centroid Depth (x) (inches): k^2

Damage Centroid Depth (y) (inches): Eff. Mass Ratio (gamma)

Area of Damage (inches²):

2015 DODGE CHARGER - Side Impact

Curb Weight (pounds):

Occupant + Cargo Weight (pounds):

Total Weight (pounds):

Angle Coll Force to Normal (degrees):

No Damage Speed (mph):

Energy Crush Depth (inches):

Damage Length (inches):

Crush Profile Measurements:

PDOF

Lever Arm Distance (inches):

Yaw Moment of Inertia (lb-ft-sec²):

	Unequal Spacing		Zone		Area	
	Spacing (inches)	Zone Area (inches ²)	Depth(x) (inches)	Depth(y) (inches)	Depth(x) (inches ³)	Depth(y) (inches ³)
C1 (inches)	<input type="text" value="0.00"/>	<input type="text" value="47.00"/>	<input type="text" value="4.33"/>	<input type="text" value="31.33"/>	<input type="text" value="1323.83"/>	<input type="text" value="9572.33"/>
C2 (inches)	<input type="text" value="13.00"/>	<input type="text" value="37.00"/>	<input type="text" value="5.15"/>	<input type="text" value="53.65"/>	<input type="text" value="1905.50"/>	<input type="text" value="19850.50"/>
C3 (inches)	<input type="text" value="7.00"/>	<input type="text" value="370.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C4 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	Average Force		Damage Energy (ft*lbs)	KE		Delta V (mph)	bsub1
	A	B		Speed (mph)	Delta V (mph)		
Minimum	<input type="text" value="86.3"/>	<input type="text" value="49.3"/>	<input type="text" value="20270.25"/>	<input type="text" value="11.9"/>	<input type="text" value="12.2"/>	<input type="text" value="20.1"/>	
Avg - 2 Std. Deviations	<input type="text" value="60.0"/>	<input type="text" value="23.9"/>	<input type="text" value="10331.36"/>	<input type="text" value="8.9"/>	<input type="text" value="10.7"/>	<input type="text" value="14.0"/>	
Avg - 1 Std. Deviations	<input type="text" value="123.4"/>	<input type="text" value="101.0"/>	<input type="text" value="34646.23"/>	<input type="text" value="16.2"/>	<input type="text" value="16.4"/>	<input type="text" value="28.8"/>	
Average	<input type="text" value="165.2"/>	<input type="text" value="180.7"/>	<input type="text" value="58466.06"/>	<input type="text" value="21.1"/>	<input type="text" value="21.1"/>	<input type="text" value="38.5"/>	
Avg + 1 Std. Deviations	<input type="text" value="198.7"/>	<input type="text" value="261.5"/>	<input type="text" value="82098.64"/>	<input type="text" value="25.0"/>	<input type="text" value="24.9"/>	<input type="text" value="46.3"/>	
Avg + 2 Std. Deviations	<input type="text" value="227.5"/>	<input type="text" value="342.9"/>	<input type="text" value="105624.05"/>	<input type="text" value="28.3"/>	<input type="text" value="28.2"/>	<input type="text" value="53.1"/>	
Maximum	<input type="text" value="257.4"/>	<input type="text" value="438.8"/>	<input type="text" value="133115.07"/>	<input type="text" value="31.8"/>	<input type="text" value="31.6"/>	<input type="text" value="60.0"/>	

Damage Centroid Depth (x) (inches): k^2

Damage Centroid Depth (y) (inches): Eff. Mass Ratio (gamma)

Area of Damage (inches²):

CRASH TEST 2

The setup for Test 2 is that the Charger began to pull out into the intersection and then stopped part way through due to traffic in front of them.. The driver of the Lincoln MKZ stated that he was doing “around 50 mph”. After the collision occurred, the Lincoln MKZ continued on and impacted a vehicle moving through the intersection in the opposite direction.

In Crash Test 2 a 2 point profile was used for the crush damage to the front of the crash damage to the Lincoln MKZ bullet vehicle, and a 4 point profile was used for the damage to the side of the Dodge Charger around the rear wheel well.

For the first run through I like to set the Lever Arm on both vehicles to 0 and set the Angle to the Collision Surface to 0 for both vehicles. The result of this on the speed calculations is that the closing speeds calculated will be at a minimum for each set of A-B stiffness values.

Using this setup, the closing (in this case, impact) speed of the Lincoln MKZ based on average stiffness values for the Lincoln MKZ (Similar Vehicle tests for the Ford Fusion is the basis for the stiffness values) is 45.8 mph. The likely range of the closing speed is within +/- one Standard Deviation of the average which is 38.0-52.4 mph.

Since the impact was over the rear axle of the Charger, the effect of the lever arm of ~64 inches was also analyzed. When the lever arm was added, the closing speed of the Lincoln MKZ based on the average stiffness values increases to 57.4 mph with a likely range of 47.7-65.7 mph. It can be seen that adding the lever arm increases the calculated closing speed in this test by about 12 mph for the average stiffness values.

Recall that the bullet vehicle had two significant impacts to its front end in this test, the result of this is that there is more crush to the Lincoln MKZ than can be attributed to the impact between the Lincoln MKZ and the Charger. This will result in a higher than actual speed calculated for the Lincoln MKZ for the impact between the Lincoln MKZ and the Charger.

The Force Balance model results for this test printed “two up” follow this explanation. The Stiffness Test Summary and 2 pages for each of the Force Balance results printed one per page follow at the end of these explanations.

**Available Test Results
Front Impact Test Summary**

Report Filter Settings

Year Range: 2007 - 2012
Make: LINCOLN
Model: MKZ

Test Number	Vehicle Info	No			Vehicle Width				Crush Factor
		Damage Speed (mph)	Average Crush (inch)	KEES (mph)	Stiffness		Values		
					A	B	G	Kv	
6225	2008 FORD FUSION FOUR DOOR SEDAN	5.0	23.4	35.0	268.9	68.9	524.3	93.8	20.9
6755	2010 FORD FUSION FOUR DOOR SEDAN	5.0	21.9	35.0	278.5	76.1	509.5	103.7	22.3
5546	2006 FORD FUSION FOUR DOOR SEDAN	5.0	22.0	35.1	300.2	82.1	549.0	111.6	22.4
5804	2006 FORD FUSION FOUR DOOR SEDAN	5.0	12.5	25.1	344.7	111.0	535.3	173.2	20.2
7339	2011 FORD FUSION HYBRID FOUR DOOR SEDAN	5.0	19.6	35.1	354.2	108.7	577.4	147.7	25.1
7132	2011 FORD FUSION FOUR DOOR SEDAN	5.0	7.9	20.0	368.9	139.9	486.4	248.6	20.2
7139	2011 FORD FUSION FOUR DOOR SEDAN	5.0	17.7	35.2	401.1	136.9	587.3	186.0	28.0
5821	2006 FORD FUSION FOUR DOOR SEDAN	5.0	9.2	24.7	420.8	179.9	492.2	282.6	26.5
6728	2010 FORD FUSION HYBRID FOUR DOOR SEDAN	5.0	14.8	35.0	473.1	192.2	582.3	261.6	33.2
Average (AVG)					356.7	121.7	538.2	178.7	24.3
Minimum (MIN)					268.9	68.9	486.4	93.8	20.2
Maximum (MAX)					473.1	192.2	587.3	282.6	33.2
Standard Deviation (STDev-sample)					68.0	44.2	38.5	71.5	4.3
Number of Tests (n)					9				

Crash Test 2 - No Lever Arm

2008 LINCOLN MKZ - Front Impact

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):

PDOF Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

Angle Coll Force to Normal (degrees):
 No Damage Speed (mph):
 Energy Crush Depth (inches):
 Damage Length (inches):
 Crush Profile Measurements:

"Known" Stiffness Values		
	A	B
Average	<input type="text" value="356.7"/>	<input type="text" value="121.7"/>
Minimum	<input type="text" value="268.9"/>	<input type="text" value="68.9"/>
Maximum	<input type="text" value="473.1"/>	<input type="text" value="192.2"/>
Std. Deviation	<input type="text" value="68.0"/>	<input type="text" value="44.2"/>

	Equal		Zone	Area	Zone	Area
	Spacing	Zone Area	Depth(x)	Depth(x)	Depth(y)	Depth(y)
	(inches)	(inches ²)	(inches)	(inches ³)	(inches)	(inches ³)
C1 (inches)	<input type="text" value="18.00"/>	<input type="text" value="62.00"/>	<input type="text" value="7.60"/>	<input type="text" value="7068.00"/>	<input type="text" value="28.93"/>	<input type="text" value="26908.00"/>
C2 (inches)	<input type="text" value="12.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C3 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C4 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	Average Force		Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
	A	B				
Minimum	<input type="text" value="268.9"/>	<input type="text" value="68.9"/>	<input type="text" value="40374.40"/>	<input type="text" value="64132.93"/>	<input type="text" value="23.4"/>	<input type="text" value="19.1"/>
Avg - 2 Std. Deviations	<input type="text" value="220.7"/>	<input type="text" value="33.3"/>	<input type="text" value="22326.20"/>	<input type="text" value="40496.64"/>	<input type="text" value="18.6"/>	<input type="text" value="15.1"/>
Avg - 1 Std. Deviations	<input type="text" value="288.7"/>	<input type="text" value="77.5"/>	<input type="text" value="44987.20"/>	<input type="text" value="70800.01"/>	<input type="text" value="24.6"/>	<input type="text" value="20.1"/>
Average	<input type="text" value="356.7"/>	<input type="text" value="121.7"/>	<input type="text" value="67648.20"/>	<input type="text" value="102026.37"/>	<input type="text" value="29.5"/>	<input type="text" value="24.2"/>
Avg + 1 Std. Deviations	<input type="text" value="424.7"/>	<input type="text" value="165.9"/>	<input type="text" value="90309.20"/>	<input type="text" value="133438.01"/>	<input type="text" value="33.7"/>	<input type="text" value="27.7"/>
Avg + 2 Std. Deviations	<input type="text" value="492.7"/>	<input type="text" value="210.1"/>	<input type="text" value="112970.20"/>	<input type="text" value="164917.98"/>	<input type="text" value="37.5"/>	<input type="text" value="30.8"/>
Maximum	<input type="text" value="473.1"/>	<input type="text" value="192.2"/>	<input type="text" value="104039.10"/>	<input type="text" value="152879.43"/>	<input type="text" value="36.1"/>	<input type="text" value="29.7"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="7.60"/>		k^2		<input type="text" value="3186.82"/>	
Damage Centroid Depth (y) (inches)	<input type="text" value="28.93"/>		Eff. Mass Ratio (gamma)		<input type="text" value="1.00"/>	
Area of Damage (inches ²):	<input type="text" value="930.00"/>					

2015 DODGE CHARGER - Side Impact

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):

PDOF Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

Angle Coll Force to Normal (degrees):
 No Damage Speed (mph):
 Energy Crush Depth (inches):
 Damage Length (inches):
 Crush Profile Measurements:

	Unequal		Zone	Area	Zone	Area
	Spacing	Zone Area	Depth(x)	Depth(x)	Depth(y)	Depth(y)
	(inches)	(inches ²)	(inches)	(inches ³)	(inches)	(inches ³)
C1 (inches)	<input type="text" value="0.00"/>	<input type="text" value="31.00"/>	<input type="text" value="2.33"/>	<input type="text" value="253.17"/>	<input type="text" value="20.67"/>	<input type="text" value="2242.33"/>
C2 (inches)	<input type="text" value="7.00"/>	<input type="text" value="19.00"/>	<input type="text" value="2.82"/>	<input type="text" value="294.50"/>	<input type="text" value="27.64"/>	<input type="text" value="2888.00"/>
C3 (inches)	<input type="text" value="4.00"/>	<input type="text" value="32.00"/>	<input type="text" value="1.33"/>	<input type="text" value="85.33"/>	<input type="text" value="74.67"/>	<input type="text" value="4778.67"/>
C4 (inches)	<input type="text" value="0.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	Average Force		Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
	A	B				
Minimum	<input type="text" value="190.6"/>	<input type="text" value="235.0"/>	<input type="text" value="40374.40"/>	<input type="text" value="17331.49"/>	<input type="text" value="11.5"/>	<input type="text" value="17.1"/>
Avg - 2 Std. Deviations	<input type="text" value="136.6"/>	<input type="text" value="120.7"/>	<input type="text" value="22326.20"/>	<input type="text" value="10053.59"/>	<input type="text" value="8.7"/>	<input type="text" value="13.4"/>
Avg - 1 Std. Deviations	<input type="text" value="202.3"/>	<input type="text" value="264.8"/>	<input type="text" value="44987.20"/>	<input type="text" value="19176.12"/>	<input type="text" value="12.1"/>	<input type="text" value="17.9"/>
Average	<input type="text" value="252.8"/>	<input type="text" value="413.4"/>	<input type="text" value="67648.20"/>	<input type="text" value="28184.58"/>	<input type="text" value="14.6"/>	<input type="text" value="21.6"/>
Avg + 1 Std. Deviations	<input type="text" value="295.4"/>	<input type="text" value="564.3"/>	<input type="text" value="90309.20"/>	<input type="text" value="37133.87"/>	<input type="text" value="16.8"/>	<input type="text" value="24.7"/>
Avg + 2 Std. Deviations	<input type="text" value="332.9"/>	<input type="text" value="716.7"/>	<input type="text" value="112970.20"/>	<input type="text" value="46045.32"/>	<input type="text" value="18.7"/>	<input type="text" value="27.4"/>
Maximum	<input type="text" value="318.6"/>	<input type="text" value="656.5"/>	<input type="text" value="104039.10"/>	<input type="text" value="42536.84"/>	<input type="text" value="18.0"/>	<input type="text" value="26.4"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="2.29"/>		k^2		<input type="text" value="3360.21"/>	
Damage Centroid Depth (y) (inches)	<input type="text" value="35.77"/>		Eff. Mass Ratio (gamma)		<input type="text" value="1.00"/>	
Area of Damage (inches ²):	<input type="text" value="277.16"/>					

Crash Test 2 - with Lever Arm

2008 LINCOLN MKZ - Front Impact

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):

PDOF
 Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

Angle Coll Force to Normal (degrees):
 No Damage Speed (mph):
 Energy Crush Depth (inches):
 Damage Length (inches):
 Crush Profile Measurements:

"Known" Stiffness Values		
	A	B
Average	<input type="text" value="356.7"/>	<input type="text" value="121.7"/>
Minimum	<input type="text" value="268.9"/>	<input type="text" value="68.9"/>
Maximum	<input type="text" value="473.1"/>	<input type="text" value="192.2"/>
Std. Deviation	<input type="text" value="68.0"/>	<input type="text" value="44.2"/>

	Equal Spacing (inches)	Zone Area (inches ²)	Zone Depth(x) (inches)	Area Depth(x) (inches ³)	Zone Depth(y) (inches)	Area Depth(y) (inches ³)
C1 (inches)	<input type="text" value="18.00"/>	<input type="text" value="62.00"/>	<input type="text" value="7.60"/>	<input type="text" value="7068.00"/>	<input type="text" value="28.93"/>	<input type="text" value="26908.00"/>
C2 (inches)	<input type="text" value="12.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C3 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C4 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	Average Force		Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)	
	A	B					
Minimum	<input type="text" value="268.9"/>	<input type="text" value="68.9"/>	<input type="text" value="40374.40"/>	<input type="text" value="64132.93"/>	<input type="text" value="23.4"/>	<input type="text" value="15.3"/>	<input type="text" value="45.4"/>
Avg - 2 Std. Deviations	<input type="text" value="220.7"/>	<input type="text" value="33.3"/>	<input type="text" value="22326.20"/>	<input type="text" value="40496.64"/>	<input type="text" value="18.6"/>	<input type="text" value="12.0"/>	<input type="text" value="35.8"/>
Avg - 1 Std. Deviations	<input type="text" value="288.7"/>	<input type="text" value="77.5"/>	<input type="text" value="44987.20"/>	<input type="text" value="70800.01"/>	<input type="text" value="24.6"/>	<input type="text" value="16.0"/>	<input type="text" value="47.7"/>
Average	<input type="text" value="356.7"/>	<input type="text" value="121.7"/>	<input type="text" value="67648.20"/>	<input type="text" value="102026.37"/>	<input type="text" value="29.5"/>	<input type="text" value="19.3"/>	<input type="text" value="57.4"/>
Avg + 1 Std. Deviations	<input type="text" value="424.7"/>	<input type="text" value="165.9"/>	<input type="text" value="90309.20"/>	<input type="text" value="133438.01"/>	<input type="text" value="33.7"/>	<input type="text" value="22.1"/>	<input type="text" value="65.7"/>
Avg + 2 Std. Deviations	<input type="text" value="492.7"/>	<input type="text" value="210.1"/>	<input type="text" value="112970.20"/>	<input type="text" value="164917.98"/>	<input type="text" value="37.5"/>	<input type="text" value="24.6"/>	<input type="text" value="73.1"/>
Maximum	<input type="text" value="473.1"/>	<input type="text" value="192.2"/>	<input type="text" value="104039.10"/>	<input type="text" value="152879.43"/>	<input type="text" value="36.1"/>	<input type="text" value="23.6"/>	<input type="text" value="70.3"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="7.60"/>			k ²	<input type="text" value="3186.82"/>		
Damage Centroid Depth (y) (inches)	<input type="text" value="28.93"/>			Eff. Mass Ratio (gamma)	<input type="text" value="1.00"/>		
Area of Damage (inches ²):	<input type="text" value="930.00"/>						

2015 DODGE CHARGER - Side Impact

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):

PDOF
 Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

Angle Coll Force to Normal (degrees):
 No Damage Speed (mph):
 Energy Crush Depth (inches):
 Damage Length (inches):
 Crush Profile Measurements:

	Unequal Spacing (inches)	Zone Area (inches ²)	Zone Depth(x) (inches)	Area Depth(x) (inches ³)	Zone Depth(y) (inches)	Area Depth(y) (inches ³)	
C1 (inches)	<input type="text" value="0.00"/>	<input type="text" value="31.00"/>	<input type="text" value="108.50"/>	<input type="text" value="2.33"/>	<input type="text" value="253.17"/>	<input type="text" value="20.67"/>	<input type="text" value="2242.33"/>
C2 (inches)	<input type="text" value="7.00"/>	<input type="text" value="19.00"/>	<input type="text" value="104.50"/>	<input type="text" value="2.82"/>	<input type="text" value="294.50"/>	<input type="text" value="27.64"/>	<input type="text" value="2888.00"/>
C3 (inches)	<input type="text" value="4.00"/>	<input type="text" value="32.00"/>	<input type="text" value="64.00"/>	<input type="text" value="1.33"/>	<input type="text" value="85.33"/>	<input type="text" value="74.67"/>	<input type="text" value="4778.67"/>
C4 (inches)	<input type="text" value="0.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	Average Force		Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	bsub1	
	A	B					
Minimum	<input type="text" value="190.6"/>	<input type="text" value="235.0"/>	<input type="text" value="40374.40"/>	<input type="text" value="17331.49"/>	<input type="text" value="11.5"/>	<input type="text" value="13.6"/>	<input type="text" value="43.4"/>
Avg - 2 Std. Deviations	<input type="text" value="136.6"/>	<input type="text" value="120.7"/>	<input type="text" value="22326.20"/>	<input type="text" value="10053.59"/>	<input type="text" value="8.7"/>	<input type="text" value="10.7"/>	<input type="text" value="31.1"/>
Avg - 1 Std. Deviations	<input type="text" value="202.3"/>	<input type="text" value="264.8"/>	<input type="text" value="44987.20"/>	<input type="text" value="19176.12"/>	<input type="text" value="12.1"/>	<input type="text" value="14.3"/>	<input type="text" value="46.1"/>
Average	<input type="text" value="252.8"/>	<input type="text" value="413.4"/>	<input type="text" value="67648.20"/>	<input type="text" value="28184.58"/>	<input type="text" value="14.6"/>	<input type="text" value="17.2"/>	<input type="text" value="57.6"/>
Avg + 1 Std. Deviations	<input type="text" value="295.4"/>	<input type="text" value="564.3"/>	<input type="text" value="90309.20"/>	<input type="text" value="37133.87"/>	<input type="text" value="16.8"/>	<input type="text" value="19.7"/>	<input type="text" value="67.2"/>
Avg + 2 Std. Deviations	<input type="text" value="332.9"/>	<input type="text" value="716.7"/>	<input type="text" value="112970.20"/>	<input type="text" value="46045.32"/>	<input type="text" value="18.7"/>	<input type="text" value="21.9"/>	<input type="text" value="75.8"/>
Maximum	<input type="text" value="318.6"/>	<input type="text" value="656.5"/>	<input type="text" value="104039.10"/>	<input type="text" value="42536.84"/>	<input type="text" value="18.0"/>	<input type="text" value="21.1"/>	<input type="text" value="72.5"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="2.29"/>			k ²	<input type="text" value="3360.21"/>		
Damage Centroid Depth (y) (inches)	<input type="text" value="35.77"/>			Eff. Mass Ratio (gamma)	<input type="text" value="0.45"/>		
Area of Damage (inches ²):	<input type="text" value="277.16"/>						

CRASH TEST 3

The setup for Test 3 is that the Charger began to pull out into the intersection to make a left turn and then stopped. The driver of the Mazda 626 stated that he was doing “around 50 mph”. Both the Mazda 626 and the Charger had no additional impacts.

In Crash Test 3 a 3 point profile was used for the crush damage to the front of the crash damage to the Mazda 626 bullet vehicle, and a 4 point profile was used for the damage to the side of the Dodge Charger around the front wheel well.

For the first run through I like to set the Lever Arm on both vehicles to 0 and set the Angle to the Collision Surface to 0 for both vehicles. The result of this on the speed calculations is that the closing speeds calculated will be at a minimum for each set of A-B stiffness values.

Using this setup, the closing (in this case, impact) speed of the Mazda 626 based on average stiffness values for the Mazda 626 is 48.5 mph. The likely range of the closing speed is within +/- one Standard Deviation of the average which is 31.0-61.4 mph.

Although there is a “Angle to the Collision Face” (Side) of the Charger, impact was over the right front corner, with no angle. For that reason, no angle is input.

The Force Balance model results for this test printed “two up” follow this explanation. The CLASS Stiffness Test Summary and 2 pages for the Force Balance results printed one per page follow at the end of these explanations.

**Available Test Results
Front Impact Test Summary
Report Filter Settings**

Year Range: 1965 - 2021
Model: 626

Test Number	Vehicle Info	No Damage Average			Vehicle Width				Crush Factor
		Speed (mph)	Crush (inch)	KEES (mph)	Stiffness		Values		
					A	B	G	Kv	
599	1983 MAZDA 626 FOUR DOOR SEDAN	5.0	24.4	35.3	216.8	53.8	436.8	73.0	20.4
1055	1987 MAZDA 626 FOUR DOOR SEDAN	5.0	20.3	29.5	217.2	52.4	450.5	75.9	17.1
118	1980 MAZDA 626 TWO DOOR COUPE	5.0	22.5	35.2	253.0	67.7	472.7	92.0	21.9
1015	1987 MAZDA 626 FOUR DOOR SEDAN	5.0	24.0	35.0	262.6	65.6	525.9	89.3	20.4
1742	1993 MAZDA 626 FOUR DOOR SEDAN	5.0	20.0	35.0	276.5	82.9	461.2	112.8	24.5
2866	1998 MAZDA 626 FOUR DOOR SEDAN	5.0	11.4	29.6	496.7	213.5	577.8	309.2	30.6
Average (AVG)					287.1	89.3	487.5	125.4	22.5
Minimum (MIN)					216.8	52.4	436.8	73.0	17.1
Maximum (MAX)					496.7	213.5	577.8	309.2	30.6
Standard Deviation (STDev-sample)					105.5	61.8	53.8	91.2	4.6
Number of Tests (n)					6				

Crash Test 3 - no Lever Arm PDOF goes through CG's

1996 MAZDA 626 - Front Impact

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):
 Angle Coll Force to Normal (degrees):
 No Damage Speed (mph):
 Energy Crush Depth (inches):
 Damage Length (inches):
 Crush Profile Measurements:

PDOF
 Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

"Known" Stiffness Values		
	A	B
Average	<input type="text" value="287.1"/>	<input type="text" value="89.3"/>
Minimum	<input type="text" value="216.8"/>	<input type="text" value="52.4"/>
Maximum	<input type="text" value="496.7"/>	<input type="text" value="213.5"/>
Std. Deviation	<input type="text" value="105.5"/>	<input type="text" value="61.8"/>

	Unequal Spacing (inches)	Zone Area (inches ²)	Zone Depth(x) (inches)	Area Depth(x) (inches ³)	Zone Depth(y) (inches)	Area Depth(y) (inches ³)
C1 (inches)	<input type="text" value="18.00"/>	<input type="text" value="33.00"/>	<input type="text" value="9.77"/>	<input type="text" value="6286.50"/>	<input type="text" value="16.92"/>	<input type="text" value="10890.00"/>
C2 (inches)	<input type="text" value="21.00"/>	<input type="text" value="26.00"/>	<input type="text" value="8.66"/>	<input type="text" value="3826.33"/>	<input type="text" value="37.98"/>	<input type="text" value="16787.33"/>
C3 (inches)	<input type="text" value="13.00"/>	<input type="text" value="643.50"/>	<input type="text" value="8.66"/>	<input type="text" value="3826.33"/>	<input type="text" value="37.98"/>	<input type="text" value="16787.33"/>
C4 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results	Average Force		Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
	A	B				
Minimum	<input type="text" value="216.8"/>	<input type="text" value="52.4"/>	<input type="text" value="34838.32"/>	<input type="text" value="65981.71"/>	<input type="text" value="27.5"/>	<input type="text" value="23.3"/>
Avg - 2 Std. Deviations	<input type="text" value="76.1"/>	<input type="text" value="-34.3"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>
Avg - 1 Std. Deviations	<input type="text" value="181.6"/>	<input type="text" value="27.5"/>	<input type="text" value="20284.20"/>	<input type="text" value="42554.21"/>	<input type="text" value="22.0"/>	<input type="text" value="18.6"/>
Average	<input type="text" value="287.1"/>	<input type="text" value="89.3"/>	<input type="text" value="56941.49"/>	<input type="text" value="103505.36"/>	<input type="text" value="34.4"/>	<input type="text" value="29.2"/>
Avg + 1 Std. Deviations	<input type="text" value="392.6"/>	<input type="text" value="151.1"/>	<input type="text" value="93598.78"/>	<input type="text" value="165374.08"/>	<input type="text" value="43.5"/>	<input type="text" value="36.9"/>
Avg + 2 Std. Deviations	<input type="text" value="498.1"/>	<input type="text" value="212.9"/>	<input type="text" value="130256.07"/>	<input type="text" value="227361.32"/>	<input type="text" value="51.0"/>	<input type="text" value="43.2"/>
Maximum	<input type="text" value="496.7"/>	<input type="text" value="213.5"/>	<input type="text" value="130540.45"/>	<input type="text" value="227716.27"/>	<input type="text" value="51.0"/>	<input type="text" value="43.3"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="9.32"/>		k^2		<input type="text" value="2646.44"/>	
Damage Centroid Depth (y) (inches)	<input type="text" value="25.50"/>		Eff. Mass Ratio (gamma)		<input type="text" value="1.00"/>	
Area of Damage (inches ²):	<input type="text" value="1085.60"/>					

2016 DODGE CHARGER

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):
 Angle Coll Force to Normal (degrees):
 No Damage Speed (mph):
 Energy Crush Depth (inches):
 Damage Length (inches):
 Crush Profile Measurements:

PDOF
 Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

	Unequal Spacing (inches)	Zone Area (inches ²)	Zone Depth(x) (inches)	Area Depth(x) (inches ³)	Zone Depth(y) (inches)	Area Depth(y) (inches ³)
C1 (inches)	<input type="text" value="0.00"/>	<input type="text" value="44.00"/>	<input type="text" value="0.67"/>	<input type="text" value="29.33"/>	<input type="text" value="29.33"/>	<input type="text" value="1290.67"/>
C2 (inches)	<input type="text" value="2.00"/>	<input type="text" value="5.00"/>	<input type="text" value="1.27"/>	<input type="text" value="15.83"/>	<input type="text" value="7.67"/>	<input type="text" value="95.83"/>
C3 (inches)	<input type="text" value="3.00"/>	<input type="text" value="43.00"/>	<input type="text" value="2.33"/>	<input type="text" value="451.50"/>	<input type="text" value="109.89"/>	<input type="text" value="21263.50"/>
C4 (inches)	<input type="text" value="6.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results	Average Force		Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
	A	B				
Minimum	<input type="text" value="172.2"/>	<input type="text" value="215.1"/>	<input type="text" value="34838.32"/>	<input type="text" value="13031.75"/>	<input type="text" value="9.9"/>	<input type="text" value="15.5"/>
Avg - 2 Std. Deviations	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>
Avg - 1 Std. Deviations	<input type="text" value="126.3"/>	<input type="text" value="115.7"/>	<input type="text" value="20284.20"/>	<input type="text" value="7954.56"/>	<input type="text" value="7.8"/>	<input type="text" value="12.4"/>
Average	<input type="text" value="226.4"/>	<input type="text" value="371.9"/>	<input type="text" value="56941.49"/>	<input type="text" value="20655.05"/>	<input type="text" value="12.5"/>	<input type="text" value="19.4"/>
Avg + 1 Std. Deviations	<input type="text" value="296.8"/>	<input type="text" value="639.0"/>	<input type="text" value="93598.78"/>	<input type="text" value="33188.31"/>	<input type="text" value="15.9"/>	<input type="text" value="24.5"/>
Avg + 2 Std. Deviations	<input type="text" value="354.3"/>	<input type="text" value="910.8"/>	<input type="text" value="130256.07"/>	<input type="text" value="45649.46"/>	<input type="text" value="18.6"/>	<input type="text" value="28.7"/>
Maximum	<input type="text" value="354.7"/>	<input type="text" value="912.9"/>	<input type="text" value="130540.45"/>	<input type="text" value="45745.94"/>	<input type="text" value="18.6"/>	<input type="text" value="28.8"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="1.99"/>		k^2		<input type="text" value="3360.21"/>	
Damage Centroid Depth (y) (inches)	<input type="text" value="90.60"/>		Eff. Mass Ratio (gamma)		<input type="text" value="1.00"/>	
Area of Damage (inches ²):	<input type="text" value="250.24"/>					

Crash Test 1

Stiffness Test Summary

Force Balance no Lever Arm

Force Balance with Lever Arm

Available Test Results
Front Impact Test Summary
Report Filter Settings

Year Range: 2000 - 2021
 Make: FORD
 Model: TAURUS

Test Number	Vehicle Info	No		KEES	Vehicle Width				Crush Factor
		Damage Average Speed (mph)	Crush (inch)		Stiffness		Values		
					A	B	G	Kv	
5143	2004 FORD TAURUS FOUR DOOR SEDAN	5.0	20.9	34.7	297.6	84.6	523.1	115.5	23.1
4150	2001 FORD TAURUS FOUR DOOR SEDAN	5.0	19.3	34.7	326.1	100.5	529.3	137.2	25.0
4174	2001 FORD TAURUS FOUR DOOR SEDAN	5.0	15.1	29.5	341.7	110.4	529.0	160.1	22.9
4134	2000 FORD TAURUS FOUR DOOR SEDAN	5.0	14.9	29.7	352.2	116.5	532.3	168.5	23.6
4135	2000 FORD TAURUS FOUR DOOR SEDAN	5.0	14.9	29.6	352.3	116.8	531.4	169.0	23.6
3248	2000 FORD TAURUS FOUR DOOR SEDAN	5.0	17.8	35.2	363.8	123.2	537.1	167.4	27.8
4776	2004 FORD TAURUS FOUR DOOR SEDAN	5.0	17.8	35.1	364.4	123.1	539.6	167.3	27.6
3225	2000 FORD TAURUS FOUR DOOR SEDAN	5.0	12.0	27.3	375.3	140.2	502.5	209.9	25.0
4987	2004 FORD TAURUS FOUR DOOR SEDAN	5.0	10.6	24.7	379.3	141.6	508.0	222.4	23.1
6808	2010 FORD TAURUS FOUR DOOR SEDAN	5.0	19.4	35.1	381.8	118.7	614.1	161.4	25.5
7302	2010 FORD TAURUS FOUR DOOR SEDAN	5.0	12.1	24.7	384.5	125.4	589.5	197.0	20.2
7271	2010 FORD TAURUS FOUR DOOR SEDAN	5.0	11.9	24.7	392.5	130.5	590.3	205.0	20.6
6964	2011 FORD TAURUS FOUR DOOR SEDAN	5.0	17.9	35.1	408.3	137.1	608.0	186.4	27.5
3224	2000 FORD TAURUS FOUR DOOR SEDAN	5.0	12.1	30.0	412.6	170.2	500.2	245.0	29.7
3150	2000 FORD TAURUS FOUR DOOR SEDAN	5.0	12.1	29.9	428.2	175.7	521.7	253.4	29.5
6967	2011 FORD TAURUS FOUR DOOR SEDAN	5.0	7.5	19.9	443.5	176.9	556.1	315.7	21.2
7872	2013 FORD TAURUS FOUR DOOR SEDAN	5.0	15.4	34.8	474.2	183.1	614.0	249.8	31.4
Average (AVG)					381.1	133.8	548.6	195.9	25.1
Minimum (MIN)					297.6	84.6	500.2	115.5	20.2
Maximum (MAX)					474.2	183.1	614.1	315.7	31.4
Standard Deviation (STDev-sample)					43.7	28.2	39.2	49.7	3.3
Number of Tests (n)					17				

2013 FORD TAURUS AWD - Front Impact

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):

PDOF
 Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

Angle Coll Force to Normal (degrees):
 No Damage Speed (mph):
 Energy Crush Depth (inches):
 Damage Length (inches):
 Crush Profile Measurements:

"Known" Stiffness Values		
	A	B
Average	<input type="text" value="348.4"/>	<input type="text" value="116.2"/>
Minimum	<input type="text" value="181.2"/>	<input type="text" value="29.5"/>
Maximum	<input type="text" value="593.3"/>	<input type="text" value="286.6"/>
Std. Devation	<input type="text" value="78.9"/>	<input type="text" value="53.6"/>

	Equal Spacing (inches)	Zone Area (inches ²)	Zone Depth(x) (inches)	Area Depth(x) (inches ³)	Zone Depth(y) (inches)	Area Depth(y) (inches ³)
C1 (inches)	<input type="text" value="7.00"/>	<input type="text" value="65.00"/>	<input type="text" value="8.21"/>	<input type="text" value="8005.83"/>	<input type="text" value="38.28"/>	<input type="text" value="37320.83"/>
C2 (inches)	<input type="text" value="23.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C3 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C4 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	A	B	Average Force (poundsf)	Damage Energy (ft*lbs)	KE Speed (mph)	Closing Delta V (mph)	Closing Speed (MPH)
Minimum	<input type="text" value="181.2"/>	<input type="text" value="29.5"/>	<input type="text" value="20270.25"/>	<input type="text" value="37417.88"/>	<input type="text" value="16.2"/>	<input type="text" value="13.7"/>	<input type="text" value="28.6"/>
Avg - 2 Std. Deviations	<input type="text" value="190.6"/>	<input type="text" value="9.0"/>	<input type="text" value="10582.00"/>	<input type="text" value="32422.77"/>	<input type="text" value="15.0"/>	<input type="text" value="11.9"/>	<input type="text" value="24.9"/>
Avg - 1 Std. Deviations	<input type="text" value="269.5"/>	<input type="text" value="62.6"/>	<input type="text" value="39276.25"/>	<input type="text" value="66802.92"/>	<input type="text" value="21.6"/>	<input type="text" value="18.4"/>	<input type="text" value="38.4"/>
Average	<input type="text" value="348.4"/>	<input type="text" value="116.2"/>	<input type="text" value="67970.50"/>	<input type="text" value="108659.78"/>	<input type="text" value="27.5"/>	<input type="text" value="23.6"/>	<input type="text" value="49.3"/>
Avg + 1 Std. Deviations	<input type="text" value="427.3"/>	<input type="text" value="169.8"/>	<input type="text" value="96664.75"/>	<input type="text" value="150912.93"/>	<input type="text" value="32.5"/>	<input type="text" value="27.9"/>	<input type="text" value="58.2"/>
Avg + 2 Std. Deviations	<input type="text" value="506.2"/>	<input type="text" value="223.4"/>	<input type="text" value="125359.00"/>	<input type="text" value="193277.12"/>	<input type="text" value="36.7"/>	<input type="text" value="31.6"/>	<input type="text" value="65.9"/>
Maximum	<input type="text" value="593.3"/>	<input type="text" value="286.6"/>	<input type="text" value="158999.75"/>	<input type="text" value="242738.01"/>	<input type="text" value="41.2"/>	<input type="text" value="35.4"/>	<input type="text" value="73.9"/>
Damage Centroid Depth (x) (inches)			<input type="text" value="8.21"/>			k ²	<input type="text" value="3474.23"/>
Damage Centroid Depth (y) (inches)			<input type="text" value="38.28"/>	Eff. Mass Ratio (gamma)		<input type="text" value="1.00"/>	
Area of Damage (inches ²):			<input type="text" value="975.00"/>				

2015 DODGE CHARGER - Side Impact

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):

PDOF
 Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

Angle Coll Force to Normal (degrees):
 No Damage Speed (mph):
 Energy Crush Depth (inches):
 Damage Length (inches):

Crush Profile Measurements:

	Unequal Spacing (inches)	Zone Area (inches ²)	Zone Depth(x) (inches)	Area Depth(x) (inches ³)	Zone Depth(y) (inches)	Area Depth(y) (inches ³)	
C1 (inches)	<input type="text" value="0.00"/>	<input type="text" value="47.00"/>	<input type="text" value="305.50"/>	<input type="text" value="4.33"/>	<input type="text" value="1323.83"/>	<input type="text" value="31.33"/>	<input type="text" value="9572.33"/>
C2 (inches)	<input type="text" value="13.00"/>	<input type="text" value="37.00"/>	<input type="text" value="370.00"/>	<input type="text" value="5.15"/>	<input type="text" value="1905.50"/>	<input type="text" value="53.65"/>	<input type="text" value="19850.50"/>
C3 (inches)	<input type="text" value="7.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C4 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	A	B	Average Force (poundsf)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	b _{sub1}
Minimum	<input type="text" value="86.3"/>	<input type="text" value="49.3"/>	<input type="text" value="20270.25"/>	<input type="text" value="18647.28"/>	<input type="text" value="11.9"/>	<input type="text" value="14.9"/>	<input type="text" value="20.1"/>
Avg - 2 Std. Deviations	<input type="text" value="60.0"/>	<input type="text" value="23.9"/>	<input type="text" value="10582.00"/>	<input type="text" value="10329.33"/>	<input type="text" value="8.9"/>	<input type="text" value="13.0"/>	<input type="text" value="14.0"/>
Avg - 1 Std. Deviations	<input type="text" value="123.4"/>	<input type="text" value="101.0"/>	<input type="text" value="39276.25"/>	<input type="text" value="34639.16"/>	<input type="text" value="16.2"/>	<input type="text" value="20.0"/>	<input type="text" value="28.8"/>
Average	<input type="text" value="165.2"/>	<input type="text" value="180.7"/>	<input type="text" value="67970.50"/>	<input type="text" value="58454.05"/>	<input type="text" value="21.1"/>	<input type="text" value="25.7"/>	<input type="text" value="38.5"/>
Avg + 1 Std. Deviations	<input type="text" value="198.7"/>	<input type="text" value="261.5"/>	<input type="text" value="96664.75"/>	<input type="text" value="82081.74"/>	<input type="text" value="25.0"/>	<input type="text" value="30.3"/>	<input type="text" value="46.3"/>
Avg + 2 Std. Deviations	<input type="text" value="227.5"/>	<input type="text" value="342.9"/>	<input type="text" value="125359.00"/>	<input type="text" value="105602.27"/>	<input type="text" value="28.3"/>	<input type="text" value="34.4"/>	<input type="text" value="53.1"/>
Maximum	<input type="text" value="257.4"/>	<input type="text" value="438.8"/>	<input type="text" value="158999.75"/>	<input type="text" value="133087.59"/>	<input type="text" value="31.8"/>	<input type="text" value="38.5"/>	<input type="text" value="60.0"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="4.78"/>				k ²	<input type="text" value="3360.21"/>	
Damage Centroid Depth (y) (inches)	<input type="text" value="43.56"/>			Eff. Mass Ratio (gamma)		<input type="text" value="1.00"/>	
Area of Damage (inches ²):	<input type="text" value="675.36"/>						

2013 FORD TAURUS AWD - Front Impact

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):

Angle Coll Force to Normal (degrees):
 No Damage Speed (mph):
 Energy Crush Depth (inches):
 Damage Length (inches):
 Crush Profile Measurements:

PDOF
 Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

"Known" Stiffness Values		
	A	B
Average	<input type="text" value="348.4"/>	<input type="text" value="116.2"/>
Minimum	<input type="text" value="181.2"/>	<input type="text" value="29.5"/>
Maximum	<input type="text" value="593.3"/>	<input type="text" value="286.6"/>
Std. Devation	<input type="text" value="78.9"/>	<input type="text" value="53.6"/>

	Equal Spacing (inches)	Zone Area (inches ²)	Zone Depth(x) (inches)	Area Depth(x) (inches ³)	Zone Depth(y) (inches)	Area Depth(y) (inches ³)
C1 (inches)	<input type="text" value="7.00"/>	<input type="text" value="65.00"/>	<input type="text" value="8.21"/>	<input type="text" value="8005.83"/>	<input type="text" value="38.28"/>	<input type="text" value="37320.83"/>
C2 (inches)	<input type="text" value="23.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C3 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C4 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	A	B	Average Force (poundsf)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	Closing Speed (MPH)
Minimum	<input type="text" value="181.2"/>	<input type="text" value="29.5"/>	<input type="text" value="20270.25"/>	<input type="text" value="37417.88"/>	<input type="text" value="16.2"/>	<input type="text" value="11.2"/>	<input type="text" value="34.8"/>
Avg - 2 Std. Deviations	<input type="text" value="190.6"/>	<input type="text" value="9.0"/>	<input type="text" value="10582.00"/>	<input type="text" value="32422.77"/>	<input type="text" value="15.0"/>	<input type="text" value="9.8"/>	<input type="text" value="30.4"/>
Avg - 1 Std. Deviations	<input type="text" value="269.5"/>	<input type="text" value="62.6"/>	<input type="text" value="39276.25"/>	<input type="text" value="66802.92"/>	<input type="text" value="21.6"/>	<input type="text" value="15.1"/>	<input type="text" value="46.8"/>
Average	<input type="text" value="348.4"/>	<input type="text" value="116.2"/>	<input type="text" value="67970.50"/>	<input type="text" value="108659.78"/>	<input type="text" value="27.5"/>	<input type="text" value="19.4"/>	<input type="text" value="60.1"/>
Avg + 1 Std. Deviations	<input type="text" value="427.3"/>	<input type="text" value="169.8"/>	<input type="text" value="96664.75"/>	<input type="text" value="150912.93"/>	<input type="text" value="32.5"/>	<input type="text" value="22.9"/>	<input type="text" value="71.0"/>
Avg + 2 Std. Deviations	<input type="text" value="506.2"/>	<input type="text" value="223.4"/>	<input type="text" value="125359.00"/>	<input type="text" value="193277.12"/>	<input type="text" value="36.7"/>	<input type="text" value="25.9"/>	<input type="text" value="80.4"/>
Maximum	<input type="text" value="593.3"/>	<input type="text" value="286.6"/>	<input type="text" value="158999.75"/>	<input type="text" value="242738.01"/>	<input type="text" value="41.2"/>	<input type="text" value="29.1"/>	<input type="text" value="90.1"/>
Damage Centroid Depth (x) (inches)			<input type="text" value="8.21"/>			k ²	<input type="text" value="3474.23"/>
Damage Centroid Depth (y) (inches)			<input type="text" value="38.28"/>	Eff. Mass Ratio (gamma)		<input type="text" value="1.00"/>	
Area of Damage (inches ²):			<input type="text" value="975.00"/>				

2015 DODGE CHARGER - Side Impact

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):

PDOF
 Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

Angle Coll Force to Normal (degrees):

No Damage Speed (mph):

Energy Crush Depth (inches):

Damage Length (inches):

Crush Profile Measurements:

	Unequal Spacing (inches)	Zone Area (inches ²)	Zone Depth(x) (inches)	Area Depth(x) (inches ³)	Zone Depth(y) (inches)	Area Depth(y) (inches ³)
C1 (inches) <input type="text" value="0.00"/>	<input type="text" value="47.00"/>	<input type="text" value="305.50"/>	<input type="text" value="4.33"/>	<input type="text" value="1323.83"/>	<input type="text" value="31.33"/>	<input type="text" value="9572.33"/>
C2 (inches) <input type="text" value="13.00"/>	<input type="text" value="37.00"/>	<input type="text" value="370.00"/>	<input type="text" value="5.15"/>	<input type="text" value="1905.50"/>	<input type="text" value="53.65"/>	<input type="text" value="19850.50"/>
C3 (inches) <input type="text" value="7.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C4 (inches) <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches) <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches) <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches) <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches) <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches) <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches) <input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	A	B	Average Force (poundsf)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	b _{sub1}
Minimum	<input type="text" value="86.3"/>	<input type="text" value="49.3"/>	<input type="text" value="20270.25"/>	<input type="text" value="18651.04"/>	<input type="text" value="11.9"/>	<input type="text" value="12.2"/>	<input type="text" value="20.1"/>
Avg - 2 Std. Deviations	<input type="text" value="60.0"/>	<input type="text" value="23.9"/>	<input type="text" value="10582.00"/>	<input type="text" value="10331.36"/>	<input type="text" value="8.9"/>	<input type="text" value="10.7"/>	<input type="text" value="14.0"/>
Avg - 1 Std. Deviations	<input type="text" value="123.4"/>	<input type="text" value="101.0"/>	<input type="text" value="39276.25"/>	<input type="text" value="34646.23"/>	<input type="text" value="16.2"/>	<input type="text" value="16.4"/>	<input type="text" value="28.8"/>
Average	<input type="text" value="165.2"/>	<input type="text" value="180.7"/>	<input type="text" value="67970.50"/>	<input type="text" value="58466.06"/>	<input type="text" value="21.1"/>	<input type="text" value="21.1"/>	<input type="text" value="38.5"/>
Avg + 1 Std. Deviations	<input type="text" value="198.7"/>	<input type="text" value="261.5"/>	<input type="text" value="96664.75"/>	<input type="text" value="82098.64"/>	<input type="text" value="25.0"/>	<input type="text" value="24.9"/>	<input type="text" value="46.3"/>
Avg + 2 Std. Deviations	<input type="text" value="227.5"/>	<input type="text" value="342.9"/>	<input type="text" value="125359.00"/>	<input type="text" value="105624.05"/>	<input type="text" value="28.3"/>	<input type="text" value="28.2"/>	<input type="text" value="53.1"/>
Maximum	<input type="text" value="257.4"/>	<input type="text" value="438.8"/>	<input type="text" value="158999.75"/>	<input type="text" value="133115.07"/>	<input type="text" value="31.8"/>	<input type="text" value="31.6"/>	<input type="text" value="60.0"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="4.78"/>				k ²	<input type="text" value="3360.21"/>	
Damage Centroid Depth (y) (inches)	<input type="text" value="43.56"/>		Eff. Mass Ratio (gamma)		<input type="text" value="0.52"/>		
Area of Damage (inches ²):	<input type="text" value="675.50"/>						

Crash Test 2

Stiffness Test Summary

Force Balance no Lever Arm

Force Balance with Lever Arm

**Available Test Results
Front Impact Test Summary**

Report Filter Settings

Year Range: 2007 - 2012
Make: LINCOLN
Model: MKZ

Test Number	Vehicle Info	No			Vehicle Width				Crush Factor
		Damage Speed (mph)	Average Crush (inch)	KEES (mph)	Stiffness		Values		
					A	B	G	Kv	
6225	2008 FORD FUSION FOUR DOOR SEDAN	5.0	23.4	35.0	268.9	68.9	524.3	93.8	20.9
6755	2010 FORD FUSION FOUR DOOR SEDAN	5.0	21.9	35.0	278.5	76.1	509.5	103.7	22.3
5546	2006 FORD FUSION FOUR DOOR SEDAN	5.0	22.0	35.1	300.2	82.1	549.0	111.6	22.4
5804	2006 FORD FUSION FOUR DOOR SEDAN	5.0	12.5	25.1	344.7	111.0	535.3	173.2	20.2
7339	2011 FORD FUSION HYBRID FOUR DOOR SEDAN	5.0	19.6	35.1	354.2	108.7	577.4	147.7	25.1
7132	2011 FORD FUSION FOUR DOOR SEDAN	5.0	7.9	20.0	368.9	139.9	486.4	248.6	20.2
7139	2011 FORD FUSION FOUR DOOR SEDAN	5.0	17.7	35.2	401.1	136.9	587.3	186.0	28.0
5821	2006 FORD FUSION FOUR DOOR SEDAN	5.0	9.2	24.7	420.8	179.9	492.2	282.6	26.5
6728	2010 FORD FUSION HYBRID FOUR DOOR SEDAN	5.0	14.8	35.0	473.1	192.2	582.3	261.6	33.2
Average (AVG)					356.7	121.7	538.2	178.7	24.3
Minimum (MIN)					268.9	68.9	486.4	93.8	20.2
Maximum (MAX)					473.1	192.2	587.3	282.6	33.2
Standard Deviation (STDev-sample)					68.0	44.2	38.5	71.5	4.3
Number of Tests (n)					9				

2008 LINCOLN MKZ - Front Impact

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):

PDOF
 Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

Angle Coll Force to Normal (degrees):
 No Damage Speed (mph):
 Energy Crush Depth (inches):
 Damage Length (inches):
 Crush Profile Measurements:

"Known" Stiffness Values

	A	B
Average	<input type="text" value="356.7"/>	<input type="text" value="121.7"/>
Minimum	<input type="text" value="268.9"/>	<input type="text" value="68.9"/>
Maximum	<input type="text" value="473.1"/>	<input type="text" value="192.2"/>
Std. Devation	<input type="text" value="68.0"/>	<input type="text" value="44.2"/>

	Equal Spacing (inches)	Zone Area (inches ²)	Zone Depth(x) (inches)	Area Depth(x) (inches ³)	Zone Depth(y) (inches)	Area Depth(y) (inches ³)
C1 (inches)	<input type="text" value="18.00"/>	<input type="text" value="62.00"/>	<input type="text" value="7.60"/>	<input type="text" value="7068.00"/>	<input type="text" value="28.93"/>	<input type="text" value="26908.00"/>
C2 (inches)	<input type="text" value="12.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C3 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C4 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	A	B	Average Force (poundsf)	Damage Energy (ft*lbs)	KE Speed (mph)	Closing Delta V (mph)	Closing Speed (MPH)
Minimum	<input type="text" value="268.9"/>	<input type="text" value="68.9"/>	<input type="text" value="40374.40"/>	<input type="text" value="64132.93"/>	<input type="text" value="23.4"/>	<input type="text" value="19.1"/>	<input type="text" value="36.2"/>
Avg - 2 Std. Deviations	<input type="text" value="220.7"/>	<input type="text" value="33.3"/>	<input type="text" value="22326.20"/>	<input type="text" value="40496.64"/>	<input type="text" value="18.6"/>	<input type="text" value="15.1"/>	<input type="text" value="28.5"/>
Avg - 1 Std. Deviations	<input type="text" value="288.7"/>	<input type="text" value="77.5"/>	<input type="text" value="44987.20"/>	<input type="text" value="70800.01"/>	<input type="text" value="24.6"/>	<input type="text" value="20.1"/>	<input type="text" value="38.0"/>
Average	<input type="text" value="356.7"/>	<input type="text" value="121.7"/>	<input type="text" value="67648.20"/>	<input type="text" value="102026.37"/>	<input type="text" value="29.5"/>	<input type="text" value="24.2"/>	<input type="text" value="45.8"/>
Avg + 1 Std. Deviations	<input type="text" value="424.7"/>	<input type="text" value="165.9"/>	<input type="text" value="90309.20"/>	<input type="text" value="133438.01"/>	<input type="text" value="33.7"/>	<input type="text" value="27.7"/>	<input type="text" value="52.4"/>
Avg + 2 Std. Deviations	<input type="text" value="492.7"/>	<input type="text" value="210.1"/>	<input type="text" value="112970.20"/>	<input type="text" value="164917.98"/>	<input type="text" value="37.5"/>	<input type="text" value="30.8"/>	<input type="text" value="58.3"/>
Maximum	<input type="text" value="473.1"/>	<input type="text" value="192.2"/>	<input type="text" value="104039.10"/>	<input type="text" value="152879.43"/>	<input type="text" value="36.1"/>	<input type="text" value="29.7"/>	<input type="text" value="56.1"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="7.60"/>				k ²	<input type="text" value="3186.82"/>	
Damage Centroid Depth (y) (inches)	<input type="text" value="28.93"/>				Eff. Mass Ratio (gamma)	<input type="text" value="1.00"/>	
Area of Damage (inches ²):	<input type="text" value="930.00"/>						

2015 DODGE CHARGER - Side Impact

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):

PDOF
 Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

Angle Coll Force to Normal (degrees):

No Damage Speed (mph):

Energy Crush Depth (inches):

Damage Length (inches):

Crush Profile Measurements:

	Unequal Spacing (inches)	Zone Area (inches ²)	Zone Depth(x) (inches)	Area Depth(x) (inches ³)	Zone Depth(y) (inches)	Area Depth(y) (inches ³)	
C1 (inches)	<input type="text" value="0.00"/>	<input type="text" value="31.00"/>	<input type="text" value="108.50"/>	<input type="text" value="2.33"/>	<input type="text" value="253.17"/>	<input type="text" value="20.67"/>	<input type="text" value="2242.33"/>
C2 (inches)	<input type="text" value="7.00"/>	<input type="text" value="19.00"/>	<input type="text" value="104.50"/>	<input type="text" value="2.82"/>	<input type="text" value="294.50"/>	<input type="text" value="27.64"/>	<input type="text" value="2888.00"/>
C3 (inches)	<input type="text" value="4.00"/>	<input type="text" value="32.00"/>	<input type="text" value="64.00"/>	<input type="text" value="1.33"/>	<input type="text" value="85.33"/>	<input type="text" value="74.67"/>	<input type="text" value="4778.67"/>
C4 (inches)	<input type="text" value="0.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	A	B	Average Force (poundsf)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	b _{sub1}
Minimum	<input type="text" value="190.6"/>	<input type="text" value="235.0"/>	<input type="text" value="40374.40"/>	<input type="text" value="17331.49"/>	<input type="text" value="11.5"/>	<input type="text" value="17.1"/>	<input type="text" value="43.4"/>
Avg - 2 Std. Deviations	<input type="text" value="136.6"/>	<input type="text" value="120.7"/>	<input type="text" value="22326.20"/>	<input type="text" value="10053.59"/>	<input type="text" value="8.7"/>	<input type="text" value="13.4"/>	<input type="text" value="31.1"/>
Avg - 1 Std. Deviations	<input type="text" value="202.3"/>	<input type="text" value="264.8"/>	<input type="text" value="44987.20"/>	<input type="text" value="19176.12"/>	<input type="text" value="12.1"/>	<input type="text" value="17.9"/>	<input type="text" value="46.1"/>
Average	<input type="text" value="252.8"/>	<input type="text" value="413.4"/>	<input type="text" value="67648.20"/>	<input type="text" value="28184.58"/>	<input type="text" value="14.6"/>	<input type="text" value="21.6"/>	<input type="text" value="57.6"/>
Avg + 1 Std. Deviations	<input type="text" value="295.4"/>	<input type="text" value="564.3"/>	<input type="text" value="90309.20"/>	<input type="text" value="37133.87"/>	<input type="text" value="16.8"/>	<input type="text" value="24.7"/>	<input type="text" value="67.2"/>
Avg + 2 Std. Deviations	<input type="text" value="332.9"/>	<input type="text" value="716.7"/>	<input type="text" value="112970.20"/>	<input type="text" value="46045.32"/>	<input type="text" value="18.7"/>	<input type="text" value="27.4"/>	<input type="text" value="75.8"/>
Maximum	<input type="text" value="318.6"/>	<input type="text" value="656.5"/>	<input type="text" value="104039.10"/>	<input type="text" value="42536.84"/>	<input type="text" value="18.0"/>	<input type="text" value="26.4"/>	<input type="text" value="72.5"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="2.29"/>				k ²	<input type="text" value="3360.21"/>	
Damage Centroid Depth (y) (inches)	<input type="text" value="35.77"/>				Eff. Mass Ratio (gamma)	<input type="text" value="1.00"/>	
Area of Damage (inches ²):	<input type="text" value="277.16"/>						

2008 LINCOLN MKZ - Front Impact

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):

PDOF
 Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

Angle Coll Force to Normal (degrees):
 No Damage Speed (mph):
 Energy Crush Depth (inches):
 Damage Length (inches):
 Crush Profile Measurements:

"Known" Stiffness Values		
	A	B
Average	<input type="text" value="356.7"/>	<input type="text" value="121.7"/>
Minimum	<input type="text" value="268.9"/>	<input type="text" value="68.9"/>
Maximum	<input type="text" value="473.1"/>	<input type="text" value="192.2"/>
Std. Devation	<input type="text" value="68.0"/>	<input type="text" value="44.2"/>

	Equal Spacing (inches)	Zone Area (inches ²)	Zone Depth(x) (inches)	Area Depth(x) (inches ³)	Zone Depth(y) (inches)	Area Depth(y) (inches ³)
C1 (inches)	<input type="text" value="18.00"/>	<input type="text" value="62.00"/>	<input type="text" value="7.60"/>	<input type="text" value="7068.00"/>	<input type="text" value="28.93"/>	<input type="text" value="26908.00"/>
C2 (inches)	<input type="text" value="12.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C3 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C4 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	A	B	Average Force (poundsf)	Damage Energy (ft*lbs)	KE Speed (mph)	Closing Delta V (mph)	Closing Speed (MPH)
Minimum	<input type="text" value="268.9"/>	<input type="text" value="68.9"/>	<input type="text" value="40374.40"/>	<input type="text" value="64132.93"/>	<input type="text" value="23.4"/>	<input type="text" value="15.3"/>	<input type="text" value="45.4"/>
Avg - 2 Std. Deviations	<input type="text" value="220.7"/>	<input type="text" value="33.3"/>	<input type="text" value="22326.20"/>	<input type="text" value="40496.64"/>	<input type="text" value="18.6"/>	<input type="text" value="12.0"/>	<input type="text" value="35.8"/>
Avg - 1 Std. Deviations	<input type="text" value="288.7"/>	<input type="text" value="77.5"/>	<input type="text" value="44987.20"/>	<input type="text" value="70800.01"/>	<input type="text" value="24.6"/>	<input type="text" value="16.0"/>	<input type="text" value="47.7"/>
Average	<input type="text" value="356.7"/>	<input type="text" value="121.7"/>	<input type="text" value="67648.20"/>	<input type="text" value="102026.37"/>	<input type="text" value="29.5"/>	<input type="text" value="19.3"/>	<input type="text" value="57.4"/>
Avg + 1 Std. Deviations	<input type="text" value="424.7"/>	<input type="text" value="165.9"/>	<input type="text" value="90309.20"/>	<input type="text" value="133438.01"/>	<input type="text" value="33.7"/>	<input type="text" value="22.1"/>	<input type="text" value="65.7"/>
Avg + 2 Std. Deviations	<input type="text" value="492.7"/>	<input type="text" value="210.1"/>	<input type="text" value="112970.20"/>	<input type="text" value="164917.98"/>	<input type="text" value="37.5"/>	<input type="text" value="24.6"/>	<input type="text" value="73.1"/>
Maximum	<input type="text" value="473.1"/>	<input type="text" value="192.2"/>	<input type="text" value="104039.10"/>	<input type="text" value="152879.43"/>	<input type="text" value="36.1"/>	<input type="text" value="23.6"/>	<input type="text" value="70.3"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="7.60"/>				k ²	<input type="text" value="3186.82"/>	
Damage Centroid Depth (y) (inches)	<input type="text" value="28.93"/>				Eff. Mass Ratio (gamma)	<input type="text" value="1.00"/>	
Area of Damage (inches ²):	<input type="text" value="930.00"/>						

2015 DODGE CHARGER - Side Impact

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):

PDOF
 Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

Angle Coll Force to Normal (degrees):

No Damage Speed (mph):

Energy Crush Depth (inches):

Damage Length (inches):

Crush Profile Measurements:

	Unequal Spacing (inches)	Zone Area (inches ²)	Zone Depth(x) (inches)	Area Depth(x) (inches ³)	Zone Depth(y) (inches)	Area Depth(y) (inches ³)
C1 (inches)	<input type="text" value="0.00"/>	<input type="text" value="31.00"/>	<input type="text" value="2.33"/>	<input type="text" value="253.17"/>	<input type="text" value="20.67"/>	<input type="text" value="2242.33"/>
C2 (inches)	<input type="text" value="7.00"/>	<input type="text" value="19.00"/>	<input type="text" value="2.82"/>	<input type="text" value="294.50"/>	<input type="text" value="27.64"/>	<input type="text" value="2888.00"/>
C3 (inches)	<input type="text" value="4.00"/>	<input type="text" value="32.00"/>	<input type="text" value="1.33"/>	<input type="text" value="85.33"/>	<input type="text" value="74.67"/>	<input type="text" value="4778.67"/>
C4 (inches)	<input type="text" value="0.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	A	B	Average Force (poundsf)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	b _{sub1}
Minimum	<input type="text" value="190.6"/>	<input type="text" value="235.0"/>	<input type="text" value="40374.40"/>	<input type="text" value="17331.49"/>	<input type="text" value="11.5"/>	<input type="text" value="13.6"/>	<input type="text" value="43.4"/>
Avg - 2 Std. Deviations	<input type="text" value="136.6"/>	<input type="text" value="120.7"/>	<input type="text" value="22326.20"/>	<input type="text" value="10053.59"/>	<input type="text" value="8.7"/>	<input type="text" value="10.7"/>	<input type="text" value="31.1"/>
Avg - 1 Std. Deviations	<input type="text" value="202.3"/>	<input type="text" value="264.8"/>	<input type="text" value="44987.20"/>	<input type="text" value="19176.12"/>	<input type="text" value="12.1"/>	<input type="text" value="14.3"/>	<input type="text" value="46.1"/>
Average	<input type="text" value="252.8"/>	<input type="text" value="413.4"/>	<input type="text" value="67648.20"/>	<input type="text" value="28184.58"/>	<input type="text" value="14.6"/>	<input type="text" value="17.2"/>	<input type="text" value="57.6"/>
Avg + 1 Std. Deviations	<input type="text" value="295.4"/>	<input type="text" value="564.3"/>	<input type="text" value="90309.20"/>	<input type="text" value="37133.87"/>	<input type="text" value="16.8"/>	<input type="text" value="19.7"/>	<input type="text" value="67.2"/>
Avg + 2 Std. Deviations	<input type="text" value="332.9"/>	<input type="text" value="716.7"/>	<input type="text" value="112970.20"/>	<input type="text" value="46045.32"/>	<input type="text" value="18.7"/>	<input type="text" value="21.9"/>	<input type="text" value="75.8"/>
Maximum	<input type="text" value="318.6"/>	<input type="text" value="656.5"/>	<input type="text" value="104039.10"/>	<input type="text" value="42536.84"/>	<input type="text" value="18.0"/>	<input type="text" value="21.1"/>	<input type="text" value="72.5"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="2.29"/>				k ²	<input type="text" value="3360.21"/>	
Damage Centroid Depth (y) (inches)	<input type="text" value="35.77"/>		Eff. Mass Ratio (gamma)		<input type="text" value="0.45"/>		
Area of Damage (inches ²):	<input type="text" value="277.16"/>						

Crash Test 3

Stiffness Test Summary
Force Balance no Lever Arm

**Available Test Results
Front Impact Test Summary
Report Filter Settings**

Year Range: 1965 - 2021
Model: 626

Test Number	Vehicle Info	No Damage Average			Vehicle Width				Crush Factor
		Speed (mph)	Crush (inch)	KEES (mph)	Stiffness		Values		
					A	B	G	Kv	
599	1983 MAZDA 626 FOUR DOOR SEDAN	5.0	24.4	35.3	216.8	53.8	436.8	73.0	20.4
1055	1987 MAZDA 626 FOUR DOOR SEDAN	5.0	20.3	29.5	217.2	52.4	450.5	75.9	17.1
118	1980 MAZDA 626 TWO DOOR COUPE	5.0	22.5	35.2	253.0	67.7	472.7	92.0	21.9
1015	1987 MAZDA 626 FOUR DOOR SEDAN	5.0	24.0	35.0	262.6	65.6	525.9	89.3	20.4
1742	1993 MAZDA 626 FOUR DOOR SEDAN	5.0	20.0	35.0	276.5	82.9	461.2	112.8	24.5
2866	1998 MAZDA 626 FOUR DOOR SEDAN	5.0	11.4	29.6	496.7	213.5	577.8	309.2	30.6
Average (AVG)					287.1	89.3	487.5	125.4	22.5
Minimum (MIN)					216.8	52.4	436.8	73.0	17.1
Maximum (MAX)					496.7	213.5	577.8	309.2	30.6
Standard Deviation (STDev-sample)					105.5	61.8	53.8	91.2	4.6
Number of Tests (n)					6				

1996 MAZDA 626 - Front Impact

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):

PDOF
 Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

Angle Coll Force to Normal (degrees):
 No Damage Speed (mph):
 Energy Crush Depth (inches):
 Damage Length (inches):
 Crush Profile Measurements:

"Known" Stiffness Values

	A	B
Average	<input type="text" value="287.1"/>	<input type="text" value="89.3"/>
Minimum	<input type="text" value="216.8"/>	<input type="text" value="52.4"/>
Maximum	<input type="text" value="496.7"/>	<input type="text" value="213.5"/>
Std. Devation	<input type="text" value="105.5"/>	<input type="text" value="61.8"/>

	Unequal Spacing (inches)	Zone Area (inches ²)	Zone Depth(x) (inches)	Area Depth(x) (inches ³)	Zone Depth(y) (inches)	Area Depth(y) (inches ³)
C1 (inches)	<input type="text" value="18.00"/>	<input type="text" value="33.00"/>	<input type="text" value="9.77"/>	<input type="text" value="6286.50"/>	<input type="text" value="16.92"/>	<input type="text" value="10890.00"/>
C2 (inches)	<input type="text" value="21.00"/>	<input type="text" value="26.00"/>	<input type="text" value="8.66"/>	<input type="text" value="3826.33"/>	<input type="text" value="37.98"/>	<input type="text" value="16787.33"/>
C3 (inches)	<input type="text" value="13.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C4 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	A	B	Average Force (poundsf)	Damage Energy (ft*lbs)	KE Speed (mph)	Closing Delta V (mph)	Closing Speed (MPH)
Minimum	<input type="text" value="216.8"/>	<input type="text" value="52.4"/>	<input type="text" value="34838.32"/>	<input type="text" value="65981.71"/>	<input type="text" value="27.5"/>	<input type="text" value="23.3"/>	<input type="text" value="38.7"/>
Avg - 2 Std. Deviations	<input type="text" value="76.1"/>	<input type="text" value="-34.3"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>
Avg - 1 Std. Deviations	<input type="text" value="181.6"/>	<input type="text" value="27.5"/>	<input type="text" value="20284.20"/>	<input type="text" value="42554.21"/>	<input type="text" value="22.0"/>	<input type="text" value="18.6"/>	<input type="text" value="31.0"/>
Average	<input type="text" value="287.1"/>	<input type="text" value="89.3"/>	<input type="text" value="56941.49"/>	<input type="text" value="103505.36"/>	<input type="text" value="34.4"/>	<input type="text" value="29.2"/>	<input type="text" value="48.5"/>
Avg + 1 Std. Deviations	<input type="text" value="392.6"/>	<input type="text" value="151.1"/>	<input type="text" value="93598.78"/>	<input type="text" value="165374.08"/>	<input type="text" value="43.5"/>	<input type="text" value="36.9"/>	<input type="text" value="61.4"/>
Avg + 2 Std. Deviations	<input type="text" value="498.1"/>	<input type="text" value="212.9"/>	<input type="text" value="130256.07"/>	<input type="text" value="227361.32"/>	<input type="text" value="51.0"/>	<input type="text" value="43.2"/>	<input type="text" value="72.0"/>
Maximum	<input type="text" value="496.7"/>	<input type="text" value="213.5"/>	<input type="text" value="130540.45"/>	<input type="text" value="227716.27"/>	<input type="text" value="51.0"/>	<input type="text" value="43.3"/>	<input type="text" value="72.0"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="9.32"/>				k ²	<input type="text" value="2646.44"/>	
Damage Centroid Depth (y) (inches)	<input type="text" value="25.50"/>				Eff. Mass Ratio (gamma)	<input type="text" value="1.00"/>	
Area of Damage (inches ²):	<input type="text" value="1085.60"/>						

2016 DODGE CHARGER

Curb Weight (pounds):
 Occupant + Cargo Weight (pounds):
 Total Weight (pounds):

PDOF
 Lever Arm Distance (inches):
 Yaw Moment of Inertia (lb-ft-sec²):

Angle Coll Force to Normal (degrees):

No Damage Speed (mph):

Energy Crush Depth (inches):

Damage Length (inches):

Crush Profile Measurements:

	Unequal Spacing (inches)	Zone Area (inches ²)	Zone Depth(x) (inches)	Area Depth(x) (inches ³)	Zone Depth(y) (inches)	Area Depth(y) (inches ³)
C1 (inches)	<input type="text" value="0.00"/>	<input type="text" value="44.00"/>	<input type="text" value="0.67"/>	<input type="text" value="29.33"/>	<input type="text" value="29.33"/>	<input type="text" value="1290.67"/>
C2 (inches)	<input type="text" value="2.00"/>	<input type="text" value="5.00"/>	<input type="text" value="1.27"/>	<input type="text" value="15.83"/>	<input type="text" value="7.67"/>	<input type="text" value="95.83"/>
C3 (inches)	<input type="text" value="3.00"/>	<input type="text" value="43.00"/>	<input type="text" value="2.33"/>	<input type="text" value="451.50"/>	<input type="text" value="109.89"/>	<input type="text" value="21263.50"/>
C4 (inches)	<input type="text" value="6.00"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C5 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C6 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C7 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C8 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C9 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
C10 (inches)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Average Crush (inches):

Results

	A	B	Average Force (poundsf)	Damage Energy (ft*lbs)	KE Speed (mph)	Delta V (mph)	b _{sub1}
Minimum	<input type="text" value="172.2"/>	<input type="text" value="215.1"/>	<input type="text" value="34838.32"/>	<input type="text" value="13031.75"/>	<input type="text" value="9.9"/>	<input type="text" value="15.5"/>	<input type="text" value="44.0"/>
Avg - 2 Std. Deviations	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>
Avg - 1 Std. Deviations	<input type="text" value="126.3"/>	<input type="text" value="115.7"/>	<input type="text" value="20284.20"/>	<input type="text" value="7954.56"/>	<input type="text" value="7.8"/>	<input type="text" value="12.4"/>	<input type="text" value="32.3"/>
Average	<input type="text" value="226.4"/>	<input type="text" value="371.9"/>	<input type="text" value="56941.49"/>	<input type="text" value="20655.05"/>	<input type="text" value="12.5"/>	<input type="text" value="19.4"/>	<input type="text" value="57.8"/>
Avg + 1 Std. Deviations	<input type="text" value="296.8"/>	<input type="text" value="639.0"/>	<input type="text" value="93598.78"/>	<input type="text" value="33188.31"/>	<input type="text" value="15.9"/>	<input type="text" value="24.5"/>	<input type="text" value="75.8"/>
Avg + 2 Std. Deviations	<input type="text" value="354.3"/>	<input type="text" value="910.8"/>	<input type="text" value="130256.07"/>	<input type="text" value="45649.46"/>	<input type="text" value="18.6"/>	<input type="text" value="28.7"/>	<input type="text" value="90.5"/>
Maximum	<input type="text" value="354.7"/>	<input type="text" value="912.9"/>	<input type="text" value="130540.45"/>	<input type="text" value="45745.94"/>	<input type="text" value="18.6"/>	<input type="text" value="28.8"/>	<input type="text" value="90.6"/>
Damage Centroid Depth (x) (inches)	<input type="text" value="1.99"/>				k ²	<input type="text" value="3360.21"/>	
Damage Centroid Depth (y) (inches)	<input type="text" value="90.60"/>		Eff. Mass Ratio (gamma)		<input type="text" value="1.00"/>		
Area of Damage (inches ²):	<input type="text" value="250.24"/>						